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from the point *c* to the points *f* and *g*. Through the point *c* draw a right-hand isometrical line *h c i*, and through the same point a left-handed isometrical line *j c k*. Take the distance of four divisions in the line *a d*, Fig. 2, from the point *a*, and set it off from the point *c*, Fig. 4, to the points *h i j k*. Through the points *d, g, f, i, e, k, g,* and *h*, draw by hand the curve of the ellipse. By far the greater portion of the curve may be described by the compasses—these eight points being first obtained as above described—the centres of the parts *j f i* and *h g k* being found in the line *f g* produced at *l* and *m*, and the parts *h d j* and *k e i* at *n* and *o*. These curves described by the compasses will not meet, but the short portion of the ellipse not described by the compasses can very easily be drawn by hand. Fig. 5 shows the projection of the same circle, of which the major axis *d c e* is in a right-hand isometrical line. Fig. 6 is the same circle projected on a left-hand isometrical line. The same letters of reference and description apply to those two figures as in Fig. 4.

We have now given a number of examples from which the reader has been able, we hope, to gain a pretty fair notion of the mode of drawing a variety of forms within cubes. The more thoroughly the describing of forms *within cubes* is understood, the more easy will be his practice in another branch of the art, to which we now direct his attention, and in which the tedious modes of obtaining the *direction* and the exact *proportion* of isometrical lines already described are dispensed with, and a mode as simple as it is practically useful is substituted.

In Fig. 5, Plate 15, we gave the mode of constructing an isometrical ruler, *a f b*, of which both sides are angular; we also show in same figure another form of ruler, having one perpendicular side, the angle being, of course, the same as the angle *a f e*, or *b e f*. The reader desirous to practise this species of delineation should construct scales and rulers of convenient sizes of both these forms, and cut them out of black walnut or mahogany. We now propose to explain the mode of using the isometrical rulers. This must be done in conjunction with the common drawing-board and T square, so familiar to all who know any thing about architectural drawing.

Let the line *a b*, Fig. 7, Plate 31, represent the upper edge of the T square, which is supposed to be laying along the drawing-board. Take any point *c*, and moving the isometrical ruler, as in Fig. 5, Plate 15, along the edge *a b* of square till the point coincides with the angular edge of the ruler, draw through the point *c* a line along its edge, as *c d;* this will be a right-hand isometrical line. Move the ruler along the edge of the square till the angle points the other way, and till its edge coincides with the point *c*, through which draw a line *c e;* this will be a left-hand isometrical line. Let *c f* be the length of one of the sides of a cube which it is desired to draw. Set off from *c* on the lines *c d, c e,* this distance to the points *f* and *g*. Adjust the ruler till the angular edge coincides with the points *f* and *g*, through which draw lines meeting in the point *h; c f h g* is the upper side of the cube. From *f h* and *g* draw perpendicular lines parallel to the diagonal *c h*. Lower the edge of square *a b* till it is at a point, say *i j*. Then make *h l* equal to *c f*, and adjusting the ruler till its edge coincides with the point *b*, draw isometrical lines along its edge, joining *f k, c m,* in the points *k m*. The cube is thus completed.

(*To be continued.*)

The Sectorian System of Hand-Railing.

FOURTH PAPER.

On Plate 26 is shown a platform stairs, with the landing and starting riser on a line with the chord of the cylinder, placing the whole of the cylinder in the platform, thus avoiding the additional labor of curving the nosings, as when worked in the cylinder and thrown partly in the platform. Here the platform is clear of that objection, and all the balusters of the wreath gracefully encircle around the cylinder and find their landing-place on the floor of the platform.

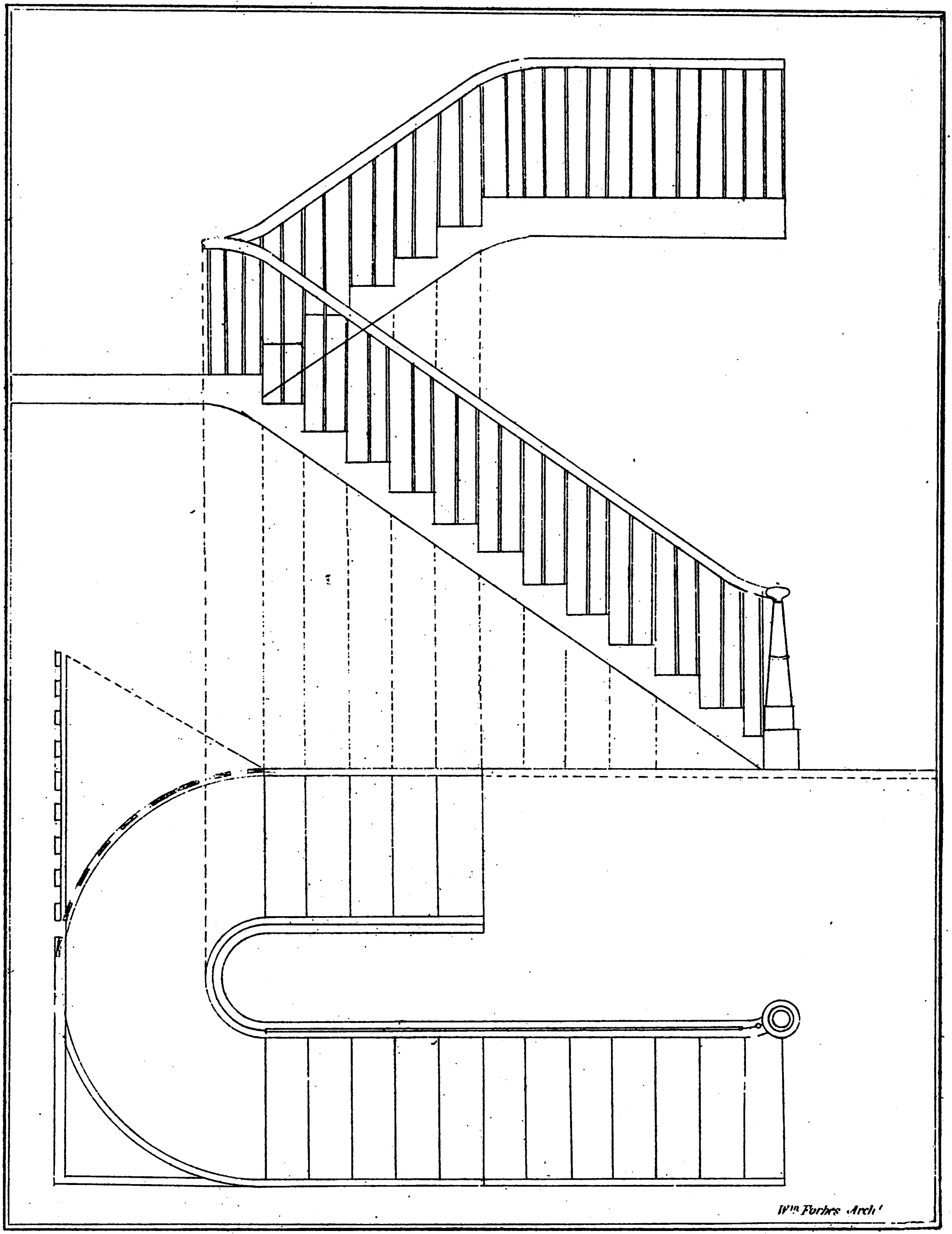
It will be seen that this plate shows a cylinder two feet diameter, and the objection often urged by stair-builders is, that the wreath rises too high for the half riser at the centre of the cylinder, and therefore the steps in the platform cannot be avoided. I claim that, according to the Sectorian System, the difficulty is entirely removed, and the wreath-pieces as easily worked out as any other part of the rail, when properly understood. The wreath-pieces are not required to be any wider in one part than another, and no thicker than the width of the rail in any part. The falling moulds for wreaths in late years have fallen into disuse and are eschewed by most authors on the subject of hand-railing, and I have been uncharitable enough to think it a want of knowledge as to the right use of those moulds, which to this system are indispensable. The wall-string shows my method of bending and keying the same. On other plates it is shown how this wreath is worked.

Hand-Railing.

GEO. W. LONGSTAFF.

Plate 27 represents a flight of stairs with seven windows forming a half circle, with flyers above and below.

Plate 26.



THE SECTORIAN SYSTEM OF HAND-RAILING.